



US009409179B2

(12) **United States Patent**  
**Ueda et al.**

(10) **Patent No.:** **US 9,409,179 B2**  
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **PULVERIZING APPARATUS AND  
PULVERIZING METHOD**

USPC ..... 241/38, 65–67, 227, 235, 293  
See application file for complete search history.

(75) Inventors: **Shigehisa Ueda**, Tokyo (JP); **Kazuo  
Noda**, Tokyo (JP)

(56) **References Cited**

(73) Assignee: **SUMITOMO BAKELITE COMPANY  
LIMITED**, Tokyo (JP)

U.S. PATENT DOCUMENTS

153,325 A \* 7/1874 Evans et al. .... 241/67  
1,564,171 A \* 12/1925 Brown ..... 241/67

(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 343 days.

(Continued)

FOREIGN PATENT DOCUMENTS

(21) Appl. No.: **13/579,309**

GB 640866 \* 8/1950 ..... B02C 4/44  
JP 54-72565 A 6/1979

(22) PCT Filed: **Feb. 21, 2011**

(Continued)

(86) PCT No.: **PCT/JP2011/053699**

OTHER PUBLICATIONS

§ 371 (c)(1),  
(2), (4) Date: **Aug. 16, 2012**

International Search Report issued in PCT/JP2011/053699 mailed  
Mar. 15, 2011.

(87) PCT Pub. No.: **WO2011/118310**

(Continued)

PCT Pub. Date: **Sep. 29, 2011**

(65) **Prior Publication Data**

US 2012/0318896 A1 Dec. 20, 2012

*Primary Examiner* — Faye Francis

(74) *Attorney, Agent, or Firm* — Birch, Stewart, Kolasch &  
Birch, LLP

(30) **Foreign Application Priority Data**

Mar. 26, 2010 (JP) ..... 2010-073419

(57) **ABSTRACT**

(51) **Int. Cl.**  
**B02C 4/02** (2006.01)  
**B02C 4/32** (2006.01)  
(Continued)

(52) **U.S. Cl.**  
CPC ... **B02C 4/02** (2013.01); **B02C 4/32** (2013.01);  
**B02C 4/44** (2013.01); **B29B 13/10** (2013.01)

(58) **Field of Classification Search**  
CPC ..... B02C 4/30; B02C 4/44; B02C 4/02;  
B02C 4/32; B02C 17/1875; B02C 17/188;  
B02C 19/186; B02C 23/24; B02C 23/26;  
B29B 9/04; B29B 13/10

A pulverizing apparatus for pulverizing a hard resin composition has a pulverizing mechanism having a pair of rollers arranged parallel to one another, these rollers pulverizing the hard resin composition by pressuring the hard resin composition between the rollers and a cooling device for cooling the hard resin composition during the hard resin composition being pulverized. Each of the rollers has a cylindrical shape with a hollow portion and the cooling device is configured to supply a coolant into the hollow portion of each of the rollers. The coolant flows in the hollow portion of each of the rollers in a longitudinal direction of each of the rollers. The cooling device has facilitating members respectively inserted into the hollow portions of the rollers.

**9 Claims, 7 Drawing Sheets**

